

P9- Metals and arsenic in soils around abandoned mining areas. Assessing their pathways and human health impact.

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Mining wastes are sources of environmental contamination and transfer of metals (Fe, Al, Mn, Cu, Zn, Cd, Cr, As, Pb) to soil, water and crops. Twenty eight small abandoned mines at south Portugal present a serious negative environmental impact with a high potential of causing negative effects in health of exposed humans. Although toxicological effects of metals and arsenic in the concentrations found around mining areas are well known, no attention has been paid to possible harmful effects on residents. We propose an assessment of impacts on environment and public health in the village of Mina do Bugalho (S. Brás dos Matos), Alandroal. Mina do Bugalho is a small pyrite (FeS₂) - chalcopyrite (CuFeS₂) – arsenopyrite (FeAsS) ore body. The village was built on the top of slags, containing up to 9000 mg/kg of As, 5000 mg/kg of Cu, 3000 mg/kg of Mn, on which crops for human consumption are cultivated. Copper sulfates precipitate from irrigation water.

We present COMETAS, a multidisciplinary pilot project that will (1) Assess the extent of exposure to heavy metals in the human population, by measuring metals and arsenic in blood and urine; (2) determine the biological effects of the exposure by the assessment of DNA damage using the comet assay; (3) identify pathways of potentially toxic metals and associated elements from mine wastes via soils, waters and agricultural products. The environmental assessment will include the study of isotopic fractionation of Zn, Fe and Cu in the plant-soil system. Lead isotopes will be used to trace the metal sources. Tests will be done for the isotopic studies in blood and urine. A biodiversity study will be carried out using cultural techniques which will allow having a global screening of the microbes that exist within this environment and that could play an important role in mitigation processes.